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ABSTRACT

Aims and objectives. To investigate gender differences in locus of control in an alcohol dependent population.

Background. Past research on gender differences in locus of control in relation to alcohol dependence has shown mixed results. There is a need then to examine gender and locus of control in relation to alcohol dependence to ascertain the veracity of any locus of control differences as a function of gender and implications in terms of both aetiology and treatment.

Design and methods. The Multi-dimensional Health Locus of Control form-C was administered to clients from alcohol dependence treatment centres in the West of Scotland. Independent *t*-tests were carried out to assess gender differences in alcohol dependence severity and internal/external aspects of locus of control.

Results. One-hundred and eighty-eight (53% female) participants were recruited from a variety of alcohol dependence treatment centres throughout the West of Scotland. The majority of participants (72%) came from Alcoholics Anonymous groups. Females revealed a greater internal locus of control compared to men. Females also had a greater significant others locus of control score than males. Males were more reliant on chance and doctors than females. All these trends were not however statistically significant.

Conclusions. Gender differences in relation to locus of control and alcohol dependence from past studies are ambiguous however; the notion of such speculated differences have been influential in conceptualising alcohol dependency.

The current study found no clear statistically significant differences in locus of control orientation as a function of gender.

Relevance to clinical practice. This article helps nurses to contextualise health behaviours as a result of internal or external forces. It also helps nursing staff to better understand alcohol dependence treatment in relation to self-efficacy and control. Moreover, it highlights an important concept in health education theory.

Summary box – what does this paper contribute to the wider global clinical community?

- This paper provides an insight into disparate alcohol dependence treatments, including Alcoholics Anonymous which is a globally recognised treatment and the potential beneficiaries of these treatments
- This research highlights the potential for gender differences in health and therefore gender specific and tailored health education initiatives and health treatments

Key words: Substance Abuse, Women, Gender, Beliefs, Self-Efficacy, Psychometrics

INTRIDUCTION

Locus of control is a psychological construct that may be utilised to predict health-related behaviours such as healthy eating and physical activity (Grisolia et al. 2015). It is an important concept in medicine that can also be utilised to clarify and explicate these health behaviours (Rizza et al. 2015). An essential consideration of locus of control is that it may be used as a means to predict future health care utilisation (Mautner et al. 2015) and as such can play an essential function in individual healthcare planning.

The concept surrounding locus of control derives from Rotter's (1954) social learning theory and reflects the principle surrounding the self-efficacy of behaviour. Rotter (1966) believes that locus of control is a fundamental component for good psychological health. Interestingly, stigmatization has been shown to decrease self-control which in turn can have a negative effect on long-term health (Langer & Rodin 1980).

Locus of control is perceived as a personality trait and a relatively stable construct (Peterson et al. 1993). The philosophy underpinning locus of control stresses that individual behaviour is either internally (the person themselves is responsible for behaviour) or externally (outside forces are responsible for behaviour) driven (Wallston et al. 1994). Locus of control is rooted in the phenomenological approach to human behaviour and has been cited as one rationale for differences in health beliefs between men and women (Chandiramani 2014). Self-efficacy is also

correlated with health locus of control and relates to the power of an individual's thinking in achieving treatment outcomes (Myers et al. 1996). This point is reiterated by Masters and Walton (2005) who delineate that health locus of control is a crucial constituent of social learning theory and is an important variable therefore in predicting health-related behaviours. Locus of control is also associated with stress and self-esteem (Asberg & Renk 2014). Human behaviour is however expounded crudely in locus of control theory and therefore fails to address more intricate issues that pertain to the philosophy of the mind.

BACKGROUND

Loss of control is an important feature of the disease model of addiction (Rush 1805) and this vernacular was subsequently used by Jellinek (1960) to depict the archetypal "alcoholic". The philosophy behind treatment groups such as Alcoholics Anonymous (AA) asserts that "alcoholics" lack self-control and as such lack the choice whether to consume alcohol or not (Alcoholics Anonymous 2001). This lack of control is perceived to be an individual choice and as such an internal one. This makes an interesting conundrum in alcohol dependence (Moss & Dyer 2010) where tradition has argued against choice and individual control.

Davies (1997) nevertheless explains that the locus of control concept means that those that have a high internal locus of control are more able to control their dependence. However, he goes on to state that research in this area has been equivocal. In a seminal study that focused on locus of control and alcohol

dependence, it was found that women with severe alcohol dependence had greater external locus of control orientation (Obitz & Swanson 1976). Moreover, the influence of significant others, one component of external locus of control, was reported by Gomberg (1994) as a cause of heavy alcohol use in older women.

In a recent study, men achieved improved outcomes for network support treatment for alcohol dependence compared to women (Litt et al. 2015). This may indicate that men generally have a higher external locus of control in relation to alcohol dependence than women. This finding contradicts the outcome of the Obitz and Swanson (1976) and Gomberg (1994) studies that women have a generally higher external locus of control than men.

In another important study that focused on locus of control in relation to alcohol dependence in men and women, women were shown to have a greater internal locus of control compared to men (Natera et al. 1988). These findings are contrasted with a study carried out on a cohort of college students where results revealed that men tend to have a more internally orientated locus of control, whereas women tend to score higher for external locus of control (Zaidi & Moshin 2013). Furthermore, fate, a component of external locus of control and a supposed contrast to the male personality, was found to be associated with increased alcohol dependence in men (Elliott 2013).

In one current study that analysed alcohol dependence and didn't contrast males and females, significantly higher external locus of control was found across the population (Prakash et al. 2015). Conclusions from recent research into the effects of Motivational Enhancement Therapy (MET) for alcohol dependence and locus of control found that after MET, patients started to attribute their alcohol consumption more internally (Vikas & Khalique 2014). Curiously, the findings from this study help to question locus of control as a stable construct. This conundrum was initially raised by Davies (1997) who doubted Rotter's assertion of locus of control as a quasi-personality trait which is stable over time and different situations.

Importantly, individuals with a high internal locus of control may help explain the concept of spontaneous remission which denotes recovery from alcohol dependence without formal support (Walters 2000). Contrastingly, those who have a high external locus of control may fare well in organisations such as Alcoholics Anonymous (AA) where there is an emphasis on sponsor and group support. Seminal research reiterates that a more pronounced external locus of control is associated with AA treatment success (Bridgman & McQueen 1987). Moreover, another aspect of AA's ideology, a belief in a higher power, may make those with a high external locus of control more likely to succeed in the twelve-step organisation.

METHODS

Design

The design of this study is an independent or between-subjects one. It is not a randomised controlled study because participants have been pre-allocated into group according to their gender. Sample size for the study was determined according to effect calculation. Sample size calculation involves three factors; effect size, power and significance. Effect size refers to the difference between two groups. Power size refers to the probability of rejecting the null hypothesis when the alternative hypothesis is true. Significance denotes the safeguard value or probability of rejecting the null hypothesis when it is true. This value is usually set at 0.05 (1 in 20 chance) or for more intricate and complex analysis 0.01 (1 in 100 chance) (McCrum-Gardner 2010). A sample size of at least 162 participants is required for an independent *t*-test with a large effect size (Cohen's $d = 0.8$), power size approaching 1 (0.999) and a significance value of $p = 0.05$.

Participants

Participants for the study were recruited from four alcohol dependence treatment centres and groups in the West of Scotland. These centres and groups are; Renfrewshire Council on Alcohol (RCA), Glasgow Council on Alcohol (GCA), Alcohol Recovery Centre (ARC) and Alcoholics Anonymous (AA) groups. Both RCA and GCA follow similar treatment philosophies in that they provide one-to-one and group counselling for alcohol dependence. Participants from RCA and GCA followed a controlled drinking programme of treatment. ARC is a treatment centre based in the West Dunbartonshire district of Scotland and treatment is based on an abstinence approach to care. AA is a worldwide organisation their philosophy encompasses

peer-led support, the support from a named sponsor and is an abstinence-based twelve-step approach to recovery from alcohol dependence.

Participants were recruited via the snowball sampling method. Snowball sampling is described as “the process of selecting a sample using networks” (Kumar 2005, p. 179). This type of sampling method involves meeting with a small number of individuals initially and these individuals identify other members of the group who might participate in the study (Kumar 2005). Snowball sampling is beneficial if the researcher is unfamiliar with the group being researched. However, snowball sampling may help to cast doubt on the validity of the research design because participants may have similar demographic variables such as gender and age.

Data Collection

Data were collected via survey method. Participants were asked their age, age at first drink, age first drunk and age at regular drinking. Participants were further asked to complete the Severity of Alcohol Dependence Questionnaire (SADQ) to ascertain alcohol dependence severity and the Multidimensional-health Locus of Control form-C (MHLC-C) to obtain health locus of control ratings. Independent *t*-tests were carried out to try and unearth statistically significant differences between males and females regarding alcohol dependence severity and the four components of the MHLC-C.

Data Analysis

The statistical software package, SPSS version 22 was used as an aid to analyse data from this study. Independent *t*-tests were utilised as a means to determine statistically significant differences between the independent variable (gender) and the dependent variables (internal and external aspects of locus of control and alcohol dependence severity). Statistical significance was set at the conventional value of $p = <0.05$ (Walker & Almond 2010). This equates to a 95% likelihood that the difference between the variables was actual.

Severity of Alcohol Dependence Questionnaire (SADQ)

The Severity of Alcohol Dependence Questionnaire (SADQ) (Stockwell et al. 1979) was used in this study as a means of calibrating alcohol dependence in participants. In their psychometric analysis of the SADQ, Stockwell et al. (1983, p. 145) describe it as “a quick, reliable and valid instrument” for measuring alcohol dependence severity. The SADQ was initially designed around the concept underlying the Alcohol Dependence Syndrome (Stockwell et al. 1979). Alcohol Dependence Syndrome helps explain the psychobiological basis of dependence and helps to define it scientifically for clinical and research purposes (Edwards & Gross 1976). Although the SADQ has been successfully adopted in numerous studies, the author does nevertheless highlight one potential issue with it and this is its inability to tackle the issue of impaired control, which Leeman et al. (2012) describe as a key characteristic of alcohol dependence. Nevertheless, the alcohol dependence syndrome and the SADQ are still seen as contemporarily relevant (Stockwell 2015). Scores from the SADQ range from 0 to 60 and a score of 30 or more is correlated with severe alcohol dependence.

Multidimensional Health Locus of Control form-C (MHLC-C)

The Multidimensional Health Locus of Control form-C (MHLC-C) was used in this study to measure internal and external aspects of health locus of control. A number of forms have been derived from the original MHLC (Wallston et al. 1976) and these are categorised as A, B and C. Forms A and B are designed to gauge the health status of an individual (Wallston 2005) and form C is a disease specific instrument that aims to measure locus of control in any medical or health-related condition (Wallston et al. 1994). The God Health Locus of Control (GHLC) scale can be utilised as an adjunct to existing forms and is used to measure God or spirituality as a component of locus of control (Wallston et al. 1999). Religion and locus of control have also been studied together in an alcohol-dependent population where a spiritual health locus of control association was found with alcohol consumption among African American women (Holt et al. 2015).

The MHLC has been used extensively in research as well as the clinical setting (Kelly et al. 2007). The MHLC contains three distinct scales and each one is scored using a six-point Likert scale that ranges from strongly agree to strongly disagree. The three original scales of the MHLC equate to internal, chance and significant others (Wallston & Wallston 1978). Internal refers to internal locus of control or how strongly the individual perceives their reliance on their self for decision making. Chance is a description of how reliant the individual is on fate for decision making and significant others refers to a component of external locus of control and refers to the reliance of that significant other in their decision making.

The MHLC-C comprises four revised subscales of internal, chance, powerful others and doctors (Wallston et al. 1994). There is no total score as all the subscales are independent of each other. The MHLC has been successfully translated in different languages including German (van Eckert et al. 2013) and in non-Western culture (Thege et al. 2014). The MHLC has played an important role in developing locus of control theory (Baken & Stephens 2005).

The internal consistency reliability of the MHLC-C generally shows favourable Cronbach alpha scores in most studies (Wallston et al. 1994, Lundgren et al. 2007, Shehu & Mokgwathi 2008). However, some studies such as the one carried out in pregnancy by Ip & Martin (2006) revealed low Cronbach alpha scores across all domains. Other studies revealed low Cronbach alpha scores for doctors and powerful others (van Eckert et al. 2013). Moreover, the Champagne et al. (2015) study carried out on non-clinical Hispanic population, revealed an unacceptable Cronbach alpha score for the subscale powerful based on Kline's (2000) criterion of an score less than alpha 0.7.

RESULTS

One-hundred and eighty-eight participants (53% female) were recruited to this study from various alcohol dependence treatment centres throughout the West of Scotland. The majority of participants (72%) came from Alcoholics Anonymous (AA) groups throughout Glasgow and the West of Scotland and the remaining participants

were recruited from the Renfrewshire Council on Alcohol (14%), Glasgow Council on Alcohol (13%) and the Addiction Recovery Centre in Kirkintilloch (6%). A graphical account of the treatment groups is shown in Table 1.

The mean age of men for this study is 51 years of age (SD 10.13) and for women it is 48 years old (SD 9.90). Men had their first drink at an average of 15 years (SD 2.24) while women it was 16 years (SD 2.33). Men got drunk on average at 15 years of age (SD 2.25) compared to women at 17 years (SD 3.63). Men started drinking regularly at 19 years (SD 5.24) and women at 22 years (SD 6.90). The mean ages of participants is provided in Table 2.

An independent *t*-test was carried out on the results from the Severity of Alcohol Dependence Questionnaire (SADQ) to ascertain significant difference between males and females regarding the severity of alcohol dependence. The independent *t*-test found that males had a higher mean score of 53.23 (SD 14.47) compared to the female mean severity of alcohol dependence means score of 51.11 (SD 16.67) but that the difference was not statistically significant. The independent *t*-test relating to gender and alcohol dependence is provided in Table 3.

Independent *t*-tests were also carried out on internal and external aspects of locus of control in men and women from the cohort studied to show differences between them. Females had a higher mean score for internal locus of control 23.48 (SD 5.45) compared to males 22.21 (SD 6.83) but the difference between them was not

statistically significant. Males had a higher chance locus of control score 13.28 (SD 6.96) compared to women 12.01 (SD 6.33) but this was not statistically significant. Males also had a mean higher doctors locus of control score 11.18 (SD 4.31) compared to females 10.69 (SD 4.56) and again this result was not statistically significant. Finally, the female mean score for others locus of control was higher 10.61 (SD 3.51) than the male mean score 10.54 (SD 3.78) and was not statistically significant. The result of the independent *t*-test from the MHLC-C scores is provided in Table 4.

DISCUSSION

Locus of control is a narrow theory that aims to define influences behind behaviour in terms of internal or external aspects. The psychometric instrument, the Multidimensional Health locus of Control form-C (MHLC-C) attempts to define and calibrate health-related behaviour simply in terms of internal/external control. Alcohol dependence and alcohol consumption are however two states that add to the complexity surrounding health-related behaviour and control.

From this study, it is shown that men in alcohol dependence treatment centres have a greater severity of alcohol dependence than women. However this difference was not statistically significant. Both males and females scored higher than 50 in the SADQ which is the score that denotes severe alcohol dependence. These scores may reflect the cohort studied. Participants came mainly from the West of Scotland

where there is a high incidence of alcohol consumption generally which is correlated with an increase in social and health harms (Robinson et al. 2015).

Past research into gender differences in locus of control in relation to alcohol dependence remains unequivocal. This study also highlights conflicting results regarding internal and external elements of control between men and women. Females scored higher in most internal locus of control elements than men. Men however scored higher than women in 'powerful others' which is a component of internal locus of control. Men scored higher than women in chance and doctors which are two constituents of external locus of control. This means that results from this study do not correspond with a number of past studies carried out on gender, alcohol dependence and locus of control. Furthermore and importantly, all results from the independent *t*-tests carried out on the four elements of the MHLC-C were not statistically significant. Therefore, it is concluded that gender does not impact on locus of control in relation to alcohol dependence and locus of control has limited worth in gender-related alcohol dependence research, especially in a high severity alcohol dependent cohort.

Limitations

The limitations of this research are that it was carried out in a relatively small sample and in a specific geographical location. This questions the results from this study which may be unique to the sample and in the setting where it was carried out. The study does nevertheless have implications for future research. There is a question

over locus of control as a stable construct which may change over time and with age. The study also highlights that locus of control may not be a worthwhile concept to study in relation to gender and alcohol dependence given the uncertain results from this research.

CONCLUSIONS

Gender differences in relation to alcohol dependence are ambiguous. For example, both men and women have been shown to have a high external locus of control from separate studies. Participants of particular alcohol dependence treatments such as Alcoholics Anonymous have also been shown to have a high external locus of control due to the reliance of significant other (sponsor) and group support as a whole. This study adds to the confusion surrounding alcohol dependence, locus of control and gender differences. The main conclusion from the study is however that gender does not influence locus of control in relation to alcohol dependence treatment. One rationale for this is that alcohol dependence treatment is unique that is based on a philosophical viewpoint. Therefore, there may be gender differences in relation to locus of control for other health treatments and future research is called for to justify this claim. Locus of control may be better applied, not to gender differences but differences in the severity of alcohol dependence but research in this area is required to justify this presumption.

RELEVANCE TO CLINICAL PRACTICE

It is important to consider health behaviour in relation to internal and external forces for both treatment and health education purposes. This article helps contextualise these points by providing an example of health behaviour in this way. This article also raises an awareness of disparate alcohol dependence treatments. Moreover, it provides an evidence-base to nursing staff to consider the most appropriate alcohol dependence treatment for patients and to better understand alcohol dependence treatment in relation to self-efficacy and control.

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REFERENCES

Alcoholics Anonymous (2001) *Alcoholics Anonymous 4th edn*. Alcoholics Anonymous World Services, New York.

Asberg K & Renk, K (2014). Perceived stress, external locus of control, and social support as predictors of social adjustment among female inmates with or without a history of sexual abuse. *International Journal of Offender Therapy and Comparative Criminology* **58**, 59-84.

Baken D & Stephens C (2005) More Dimensions for the Multidimensional Health Locus of Control: Confirmatory Factor Analysis of Competing Models of the Structure of Control Beliefs. *Journal of Health Psychology* **15**, 643-656.

Bridgman LP & McQueen WM (1987) The success of Alcoholics Anonymous: Locus of control and God's general revelation. *Journal of Psychology and Theology* **15**, 124-131.

Chandiramani K (2014). Locus of control and subjective wellbeing: Examining gender differences. *Indian Journal of Health and Wellbeing* **5**, 325-329.

Champagne BR, Fox R.S, Mills SD, Sadler GR & Malcarne VL (2015) Multidimensional profiles of health locus of control in Hispanic American. *Journal of Health Psychology* doi: 10.1177/1359105315577117

Davies JB (1997) *The Myth of Addiction* (4th edn) Harwood Academic Publishers, Amsterdam.

Edwards G & Edwards MM (1976) Alcohol dependence: provisional description of a clinical syndrome. *British Medical Journal* **1**, 1058-1061.

Elliott M (2013) Gender differences in the determinants of distress, alcohol misuse and related psychiatric disorders. *Society and Mental Health* **3**, 96-113.

Gomberg ESL (1994) Risk factors for drinking over a woman's lifespan. *Alcohol Health & Research World* **18**, 220-227.

Grisolia JM, Longo A, Hutchinson G & Kee F (2015) Applying Health Locus of Control and Latent Class Modelling to food and physical activity choices affecting CVD risk. *Social Science & Medicine* **132**, 1-10.

Holt CL, Roth DL, Huang J & Clark EM (2015) Gender differences in the roles of religion and locus of control on alcohol use and smoking among African Americans. *Journal of Studies on Alcohol Drugs* **76**, 482-492.

Ip WY & Martin CR (2006) The Chinese version of the multidimensional health locus of control scale form C in pregnancy. *Journal of Psychosomatic Research* **61**, 821-827.

Jellinek EM (1960) *The Disease Concept of Alcoholism*. Hillhouse Press, New Haven CT.

Kelly PA, Kallen MA & Suarez-Almazor ME (2007) A combined-method psychometric analysis recommended modification of the multidimensional health locus of control scales. *Journal of Clinical Epidemiology* **60**, 440-447.

Kline P (2000) *A Psychometrics Primer*. Free Association Books, London.

Kumar R (2005) *Research Methodology: A Step-by-Step Guide for Beginners*. Sage Publications, London.

Langer J & Rodin E (1980) Aging labels: The decline of control of self-esteem. *Journal of Social Issues* **36**, 197.

Leeman RF, Patock-Peckham JA & Potenza MN (2012) Impaired control over alcohol use: An under-addressed risk factor for problem drinking in young adults? *Experimental and Clinical Psychopharmacology* **20**, 92-106.

Litt MD, Kadden RM & Tennen H (2015) Network Support treatment for alcohol dependence: Gender differences in treatment mechanisms and outcomes. *Addictive Behaviors*, **45**, 87-92.

Lundgren S, Eurenus E, Olausson A & Opava CH (2007) The Swedish version of the Multidimensional Health Locus of Control scales, form C. Aspects of reliability and validity in patients with rheumatoid arthritis. *Advances in Physiotherapy* **9**, 16-22.

Masters KS & Wallston KA (2005) Canonical correlation reveal important relations between health locus of control, coping, affect and values. *Journal of Health Psychology* **10**, 719-731.

Mautner D, Peterson B, Cunningham A, Ku B, Scott K & LaNoue M (2015) How Multidimensional Health Locus of Control predicts utilization of emergency and inpatient hospital services. *Journal of Health Psychology* doi: 10.7711359105315603469

McCrum-Gardner E (2010) Sample size and power calculations made simple. *International Journal of Therapy and Rehabilitation* **17**, 10-14.

Moss AC & Dyer KR (2010) *Psychology of Addictive Behaviour*. Palgrave MacMillan, London.

- Myers A.M, Powell LE, Maki BE, Holliday PJ, Brawley LR & Sherk W (1996) Psychological indicators of balance confidence: Relationship to actual and perceived abilities. *Journal of Gerontology* **51A**, M37-M43.
- Natera G, Herrejon ME & Casco M (1988) Locus of control in couples with different patterns of alcohol consumption. *Drug and Alcohol Dependence* 22, 179-186.
- Obitz FW & Swanson MK (1976) Control orientation in women. *Journal of Studies on Alcohol* **37**, 694-697.
- Peterson C, Maier SF & Seligman MEP (1993) *Learned Helplessness: A Theory for the Age of Personal Control*. Oxford University Press, New York.
- Prakash ., Sharma N, Singh AR, Sengar KS, Chaudhury S & Ranjan JK (2015) Personality disorder, emotional intelligence, and locus of control of patients with alcohol dependence. *Indian Journal of Psychiatry* **24**, 40-47.
- Rizza F, Gison A, Bonassi S, Dall'Armi V, Tonto F & Giaquinto S (2015) 'Locus of control', health-related quality of life, emotional distress and disability in Parkinson's disease. *Journal of Health Psychology* doi: 10.1177/1359105315616471
- Robinson M, Shipton D, Walsh D, Whyte B & McCartney G (2015) Regional alcohol consumption and alcohol-related mortality in Great Britain: novel insights using retail sales data. *BMC Public Health* **15**, doi: 10.1186/1471-2458-15-1
- Rotter JB (1954) *Social Learning and Clinical Psychology*. Prentice Hall, New York.
- Rotter JB (1966) Generalised expectancies for internal versus external control of reinforcement. *Psychological Monographs* **80**, 1-28.

Rush B (1805) *Inquiry into the Effects of Ardent Spirits upon the Human Body and Mind*. Bartam, Boston MA.

Shehu J & Mokgwathi MM (2008) Health locus of control and internal resilience factors among adolescents in Botswana: a case-control study with implications for physical education. *South African Journal for Research in Sport* **30**, 95-105.

Stockwell T, Murphy D & Hodgson R (1983) The severity of alcohol dependence questionnaire: Its use, reliability and validity. *British Journal of Addiction* **78**, 45-156.

Stockwell T, Hodgson R, Edwards G, Taylor C & Rankin H (1979) The Development of a Questionnaire to Measure Severity of Alcohol Dependence. *Addiction* **74**, 79-87.

Stockwell T (2015) The alcohol dependence syndrome: a legacy of continuing clinical and scientific importance. *Addiction* **102**, 8-11.

Thege BK, Rafael B & Rohanszky M (2014) Psychometric Properties of the Multidimensional Health Locus of Control Scale Form C in a Non-Western Culture *PLOS ONE*. **9**, e107108.

van Eckert S, Gaidys U & Martin CR (2013) Translation and application of G-MHLC-C scales in academic and non-academic nursing staff. *International Journal of Person Centered Medicine* **1**, 362-368.

Vikas RD & Khalique A (2014) Reduced craving and change in locus of control as a result of motivational enhancement therapy in patients with alcohol dependence syndrome. *Indian Journal of Health & Well Being* **5**, 1000-1003.

Walker J & Almond (2010) *Interpreting Statistical Findings: A guide for health professionals and students*. McGraw-Hill, Maidenhead.

Wallston KA (2005) The validity of the multidimensional health locus of control scales. *Journal of Health Psychology* **10**, 623-631.

Wallston BS & Wallston KA (1978) Locus of control and health: A Review of the literature. *Health Education Monograph* **6**, 107-117.

Wallston BS, Wallston KA, Kaplan GD & Maides SA (1976) The development and validation of the health related locus of control (HLC) scale. *Journal of Consulting and Clinical Psychology* **44**, 580-585.

Wallston KA, Stein MJ & Smith CA (1994) Form C of the MHLC scales: a condition-specific measure of locus of control. *Journal of Personality Assessment* **63**, 534-553.

Wallston KA, Malcarne VL, Flores L, Hansdottir I, Smith CA, Stein MJ, Weisman MH & Clements PJ (1999) Does God Determine Your Health? The God Locus of Health Control Scale. *Cognitive Therapy & Research* **23**, 131-142.

Walters GD (2000) Spontaneous remission from alcohol, tobacco and other drug abuse: seeking quantitative answers to qualitative questions. *The American Journal of Drug and Alcohol Abuse* **26**, 443-460.

Zaidi IH & Mohsin MN (2013) Locus of control in graduation students. *International Journal of Psychological Research* **6**, 15-20.

Table 1. Treatment group of participants (n = 188)

Treatment	Males (%)	Females (%)	Total (%)
RCA	12 (6.36)	15 (7.96)	27 (14.36)
AA	64 (34.04)	72 (38.30)	136 (72.36)
GCA	7 (3.72)	6 (3.19)	13 (6.91)
ARC	6 (3.19)	6 (3.19)	12 (6.38)
Total	89 (47.34)	99 (52.66)	188 (100)

Note: RCA (Renfrew Council on Alcohol), AA (Alcoholics Anonymous), GCA Glasgow Council on Alcohol, ARC (Addiction Recovery Centre, Kirkintilloch).

Table 2. Significant age-related events pertaining to alcohol and Severity of Alcohol Dependence Questionnaire scores of men and women

	Mean (SD)	Minimum	Maximum
Age			
Men	51 (10.13)	30	77
Women	48 (9.90)	24	69
First drink (age)			
Men	15 (2.24)	8	21
Women	16 (2.33)	8	21
First drunk (age)			
Men	15 (2.25)	9	24
Women	17 (3.63)	12	42
Regular drinking (age)			
Men	19 (5.24)	10	41
Women	22 (6.90)	14	21

Table 3. Severity of Alcohol Dependence Questionnaire (SADQ) independent *t*-test

SADQ	Males Mean (SD)	Females Mean (SD)	Levene's F	<i>p</i>	Cohen's <i>d</i>	<i>t</i>	<i>df</i>	Sig (2- tailed)	Power	<i>t</i>-test for Equality of Means (95% CI)	
	53.23 (14.47)	51.11 (16.67)	2.20	0.14	0.14	0.93	187	0.35	0.10	-2.38	6.61

Table 4. Multidimensional Health Locus of Control form C (MHLC-C) independent *t*-test

MHLC-C	Males Mean (SD)	Females Mean (SD)	Levene's F	<i>p</i>	Cohen's <i>d</i>	<i>t</i>	<i>df</i>	Sig (2- tailed)	Power	<i>t</i>-test for Equality of Means (95% CI)	
Internal	22.21 (6.83)	23.48 (5.45)	3.09	0.08	-0.21	-2.56	186	0.16	0.10	-3.04	0.50
Chance	13.28 (6.95)	12.01 (6.33)	0.61	0.44	0.19	1.31	186	0.19	0.10	-0.64	3.18
Doctors	11.18 (4.31)	10.68 (4.56)	1.01	0.32	0.11	0.78	186	0.44	0.06	-0.78	1.78
Others	10.54 (3.78)	10.61 (3.51)	1.03	0.31	0.02	-0.13	186	0.90	0.01	-1.12	0.98

